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**TESTIMONY OF ANTONIO M. BUELNA  
REGARDING  
U.S. BUREAU OF RECLAMATION  
WATER RIGHT PERMITS 11308 AND 11310**

5 **I. INTRODUCTION**

6 I am the Operations Chief for the South Central California Area Office of the United  
7 States Bureau of Reclamation (Reclamation), Mid Pacific Region. I received my Bachelor of  
8 Science degree in Civil Engineering from California State University, Fresno, California, in  
9 1978 and I have worked for Reclamation since 1981. A true and correct copy of my  
10 statement of qualifications is submitted contemporaneously herewith as **DOI-4** and  
11 incorporated herein by reference. As the Operations Chief, I have full responsibility for the  
12 physical operation and maintenance of Bradbury Dam and its appurtenant facilities.

13 **II. PURPOSE OF TESTIMONY**

14 The purpose of this testimony is to describe the facilities of the Cachuma Project,  
15 how they are operated, and summarize historical operational data.

16 **III. DESCRIPTION OF THE FACILITIES**

17 The Cachuma Project, located in Santa Barbara County, California consists of Lake  
18 Cachuma, formed by Bradbury Dam located on the Santa Ynez River, conveyance facilities  
19 including the Tecolote Tunnel and the South Coast Conduit, and distribution systems.  
20 Construction of the Project began in 1950 and was completed in 1956. Storage in Lake  
21 Cachuma began in November 1952. Principal features of the Project include five storage  
22 dams, which form reservoirs with a total capacity of about 189,240 acre-feet,  
23 approximately 28 miles of pipelines, 7.5 miles of tunnels and over 100 miles of laterals.  
24 (Water and Power Resources Service Project Data Book, U.S. Department of the Interior,  
25 1981)

1 Bradbury Dam is located on the Santa Ynez River approximately 25 miles northwest  
2 of Santa Barbara. It is a zoned earth-fill embankment structure, 279 feet high, has a crest  
3 length of 3,350 feet and contains approximately 6.7 million cubic yards of material. The  
4 reservoir formed by the Bradbury Dam, called Lake Cachuma, had an original capacity of  
5 205,000 acre-feet but the capacity has been reduced by siltation to approximately 188,030  
6 acre-feet. The lake covers over 3,000 acres and has over 40 miles of shoreline when full  
7 (Elevation 750 feet). The dam has a concrete-lined spillway on the left abutment, which is  
8 controlled by four 50 feet wide by 30 feet high radial gates, and has a capacity of nearly  
9 160,000 cubic feet per second. The river outlet works, which consists of two  
10 30-inch-diameter fixed cone valves and one 10-inch-diameter butterfly valve, currently has  
11 a capacity of 150 cubic feet per second.

12 In 1998-1999, Reclamation constructed a pipeline to supply water directly from the  
13 lake to Hilton Creek, a tributary to the Santa Ynez River, which flows into the river  
14 approximately 200 feet downstream of the dam. The pipeline provides a year-round  
15 source of water flow to Hilton Creek. The Hilton Creek Pipeline currently has a capacity of  
16 approximately 5 cubic feet per second. There are plans in effect to increase the flow up to  
17 10 cubic feet per second; pipeline modifications are scheduled for completion in 2004.  
18 Releases through the Hilton Creek Pipeline also provide fish flows in the main stem of the  
19 Santa Ynez River below Bradbury Dam.

20 There is also a direct connection between the Central Coast Water Authority's  
21 (CCWA) Santa Ynez Aqueduct Extension pipeline and the river outlet works, which allows  
22 CCWA to pump State Water Project (SWP) water into Lake Cachuma for temporary storage  
23 and release into the Tecolote Tunnel for delivery to the Santa Barbara area. This storage  
24 and conveyance of SWP water is provided under Contract Number 5-07-20-W1282. **(DOI-**  
25 **1e)** The system has the capacity to pump approximately 22 cubic feet per second into the  
26 lake. **(Id)**



1 dam has an inlet-outlet works and a spillway consisting of a square intake structure with  
2 trash racks on three sides, a buried 30 inch reinforced concrete pipe, and a vertical pipe  
3 stilling well.

4 Ortega Dam and reservoir are located approximately one mile north of Montecito.  
5 The dam is an embankment dam which is 131 feet high with a crest length of 430 feet.  
6 The reservoir is a concrete-lined basin with a capacity of 60 acre-feet. Release facilities at  
7 the dam consist of an inlet-outlet works and overflow spillway.

8 Carpinteria Dam and reservoir are located a few miles east of the city of Carpinteria,  
9 on a terrace approximately 200 feet above Carpinteria Creek. The dam is a four-sided  
10 earthfilled embankment with a structural height of 31 feet and a total crest length of 1,350  
11 feet. The reservoir is a concrete-lined basin with a capacity of 40 acre-feet and acts as a  
12 terminal reservoir on the South Conduit. There is an inlet-outlet structure and an overflow  
13 spillway.

#### 14 **IV. PROJECT OPERATIONS**

15 Flows of the Santa Ynez River are directly diverted to storage in Lake Cachuma  
16 behind Bradbury Dam. Water is then diverted through the Tecolote Tunnel to the south  
17 coast area via the South Coast Conduit. At that point the water is delivered to the  
18 individual water users through distribution systems operated by the Member Units<sup>1</sup>.  
19 Cachuma Project water is delivered to the Santa Ynez River Water Conservation District  
20 Improvement District No. 1 through an exchange. A small amount of water is also diverted  
21 directly from the lake for the County Park facilities. The Cachuma Project is operated to  
22 meet its authorized purposes consistent with Water Right Permits 11308 and 11310,  
23 subsequent water rights orders, Water Service Contracts, Warren Act Contracts, the

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24 <sup>1</sup> The Cachuma Member Units consist of the City of Santa Barbara; Goleta Water District; Montecito Water District;  
25 Carpinteria Valley Water District; and the Santa Ynez River Water Conservation District, Improvement District No.  
26 1, all of whom are members of the Santa Barbara County Water Agency and hold subcontracts under the Agency's  
master contract with Reclamation for water service from the Cachuma Project.

1 Cachuma Biological Opinion, and the Standard Operating Procedures. *Cachuma Project,*  
2 *California – Guidelines for Operation, Revised July 8, 2003,* was developed to describe how  
3 the project is to be operated. (DOI-30) The guidelines are reviewed and revised if needed  
4 on an annual basis. An operations coordination meeting is held annually with all the  
5 stakeholders. Stakeholders are the Member Units plus other entities that have an interest  
6 in the operation of the Project. Other stakeholders besides the member units, for example,  
7 include the Santa Ynez River Water Conservation District, City of Lompoc, Santa Barbara  
8 County, and the Central Coast Water Authority. While there are many competing interests  
9 and regulatory requirements, Reclamation strives, through the operations of the Project, to  
10 accommodate the needs of all the stakeholders.

11 The Operations Division of the South-Central California Area Office is responsible for  
12 the operation and maintenance of Bradbury Dam, the Hilton Creek Pipeline, and their  
13 appurtenant facilities. The Cachuma Field Office is located at the dam where three  
14 Irrigation System Operators (dam tenders) are responsible for day-to-day operation and  
15 maintenance of the dam and reservoir. The Cachuma Operation and Maintenance Board  
16 operates and maintains the Tecolote Tunnel, the South-Coast Conduit System, and their  
17 appurtenant facilities pursuant to a contract with Reclamation. The individual distribution  
18 systems, which take deliveries of water from the South Coast Conduit are operated and  
19 maintained by the Member Units.

20 From 1960 to 1997 water had been delivered to the Santa Ynez River Water  
21 Conservation District - Improvement District No. 1 (ID#1), a Member Unit, through a  
22 pipeline connected directly to the river outlet works. In 1995-1997, the Central Coast  
23 Water Authority (CCWA) constructed the Santa Ynez Aqueduct Extension, bringing State  
24 Water Project (SWP) water to the south coast. The ID#1 pipeline was modified and

1 became part of the Extension, allowing CCWA to pump water into Lake Cachuma for  
2 release to the Santa Barbara area through the Tecolote Tunnel and South Coast Conduit.  
3 With the completion of the Extension and the execution of an exchange agreement, the  
4 ID#1 began taking deliveries of SWP water and no longer takes direct deliveries of  
5 Cachuma Project Water (project water) through the ID#1 pipeline.

6 Releases to the Santa Ynez River (river) are made through the outlet works and/or  
7 the Hilton Creek Pipeline for downstream water rights and to maintain fish existing in the  
8 river below the dam in accordance with the Cachuma Biological Opinion. Water rights  
9 releases are made in the amounts and at the times requested by the Santa Ynez River  
10 Water Conservation District.

#### 11 **V. MODIFIED STORM OPERATIONS**

12 The Cachuma Project was not authorized as a flood control project and thus does  
13 not have space dedicated to flood control. However, the operation of the dam has provided  
14 incidental flood control benefits. After operations during the storm events in February  
15 1998, it was decided that changing the operating procedures during certain storm events  
16 could reduce the risk to the public downstream.

17 The changes (Modified Storm Operations) were proposed by the Santa Barbara  
18 County Water Agency and documented in the *Report of Modified Storm Operations –*  
19 *Bradbury Dam, Cachuma Project – Santa Barbara County, California, dated December 29,*  
20 *1998*. Reclamation conducted a risk-based evaluation to assess the incremental impact to  
21 the dam safety risk at Bradbury Dam with the modified storm operations in place. The  
22 evaluation is documented in *Technical Memorandum No. BR-8130-RA-TM-00-2, dated*  
23 *February 2000 (DOI-34)*. The evaluation concluded that the modified storm operations  
24 result in reduced out-of-channel flows downstream from the dam, as evidenced by actual  
25 implementation of the modified storm operations in February 1998 and from computer  
26 simulated operations for other historical storm events. Results also indicated that with the

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1 modified storm operations, the incremental increased dam safety risk at the dam is small  
2 and risks from the various failure modes appear to be well within Reclamation criteria.

### 3 **VI. HISTORICAL OPERATIONS**

4 Operations data has been compiled and are shown in Exhibit Number **DOI-31**.  
5 Data from water years 1953 through 2002 are included. A water year is from October 1 of  
6 the previous year through September 30 of the water year. Following is a brief summary  
7 of the data. All averages stated are for water years 1953-2002 unless noted as otherwise.

8 The average annual computed inflow, based on data since the project began  
9 operation, to Lake Cachuma is 88,647 acre-feet. This period (1953-2002) is considered to  
10 be wetter than the long-term average in the Santa Ynez River watershed<sup>2</sup>. It also coincides  
11 with the cloud seeding operations in the basin. In most years the major portion of this  
12 inflow occurs in the months of January through April. Annual State Water Project water  
13 deliveries into the lake have averaged 1,856 acre-feet since they started in Water Year  
14 1998. **(Id)**

15 Annual gross evaporation from the lake surface averaged 11,040 acre-feet. Annual  
16 precipitation at the lake averaged 20.51 inches, which equates to an average annual  
17 precipitation on the lake surface of 4,125 acre-feet. **(Id)**

18 Annual total diversions, spills, and releases from the dam averaged 78,553 acre-feet.  
19 Direct diversions from the lake for the county park averaged 179 acre-feet annually since  
20 1960. Annual diversions through the Tecolote Tunnel averaged 19,683 acre-feet since  
21 1956. Deliveries to ID#1 averaged 2,571 acre-feet in years 1960-1997. Annual  
22 downstream releases, excluding fish releases, have averaged 5,685 acre-feet. Annual  
23 releases for fishery purposes have averaged 1,795 acre-feet since 1993. Annual water  
24 rights releases have averaged 5,327 acre-feet. The reservoir has spilled 18 times since its

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26 <sup>2</sup> Flow of the Santa Ynez River below Gibraltar Dam averaged about 41,850 acre-feet per year for the period 1921-  
2002. For the period 1953-2002, the average flow was about 50,440 acre-feet per year.

1 construction, with an annual average spill of 144,165 acre-feet in those 18 years. (Id)

2 Infiltration into the Tecolote Tunnel is also considered project water. Annual  
3 infiltration into the tunnel has averaged 3,138 acre-feet since 1955. Annual project water  
4 deliveries between 1955 and 2002 averaged 24,413 acre-feet.

5 The hydrology of the Santa Ynez River is one of extremes. Computed inflow to  
6 Lake Cachuma ranged from 1,910 acre-feet in 1977 to 525,400 acre-feet in 1969. Exhibit  
7 Number **DOI-32** shows the computed inflow to Lake Cachuma in chronological order with  
8 the average annual computed inflow of 88,000 acre-feet shown as the red line. Exhibit  
9 Number **DOI-33** shows that same data rearranged in ascending order. Note that below  
10 average computed inflow occurs approximately 75 percent of the time. Annual computed  
11 inflow of less than 25,000 acre-feet occurs approximately 50 percent of the time.

12 High annual flows are usually associated with a single event. For example, in 2001  
13 the annual computed inflow was 150,243 acre-feet; of that 115,151 acre-feet or 76 percent  
14 of the annual total was associated with a single storm event that occurred on March 4  
15 through 7, 2001. (13.1 inches of rainfall was recorded at the dam; 10.39 inches occurred  
16 in a 24-hour period.) That single event produced 115,151 acre-feet of inflow to Lake  
17 Cachuma, which occurred from March 4 through 27, 2001.

## 18 **VII. OTHER ENVIRONMENTAL MONITORING**

19 The United States Geological Survey (USGS) monitors surface water flows at a  
20 number of locations along the Santa Ynez River. Data from the station at the Narrows near  
21 Lompoc and Salsipuedes Creek, USGS Station Numbers 11133000 and 11132500,  
22 respectively, are used in the Santa Ynez River Downstream Users Accounting Program  
23 (accounting program). Water levels in over 70 wells are monitored on a monthly basis.  
24 This information is also used in the monthly accounting program.

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26 Water quality samples are taken from four groundwater wells and at two surface

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1 water locations along the Santa Ynez River in both the Spring and Fall of each year. At a  
2 minimum, the samples are analyzed for the following constituents: cations, anions, total  
3 dissolved solids, and boron.

4 **VIII. SANTA YNEZ RIVER - DOWNSTREAM WATER RIGHTS OPERATIONS**

5 In accordance with State Water Resources Control Board (SWRCB) Water  
6 Rights Orders, Reclamation releases water from the Cachuma Project at rates, in the  
7 amounts and at the times requested by the Santa Ynez River Water Conservation District  
8 (SYRWCD). These releases are made through the Bradbury Dam river outlet works  
9 consistent with the flow capacity of that structure (current maximum capacity is 150 cfs)  
10 and the Hilton Creek Pipeline. The discharge through the Hilton Creek Pipeline will be  
11 limited to the rates designated by the Adaptive Management Committee.

12 On or about April 10 of each year, the SYRWCD provides Reclamation an estimate of  
13 the number and the duration of releases that may be required during the next 12 months.  
14 The estimate also indicates when (what months) the releases will be made. Actual  
15 conditions may vary substantially from this forecast.

16 SYRWCD notifies the Operations Chief when a water rights release is required. This  
17 notice indicates the time and rate at which the release is to be initiated. This notification is  
18 made in writing to the Operations Chief. SYRWCD provides this notice in advance of the  
19 requested release start date. Reclamation makes the releases as requested.

20 The need for and timing of subsequent release rate changes is determined by the  
21 SYRWCD. Notices for these changes are made by e-mail, fax or verbally to the Operations  
22 Chief. SYRWCD provides as much lead-time as possible for these changes and Reclamation  
23 makes the changes as requested. A schedule of release rate changes is developed and  
24 distributed as appropriate.

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26 The ultrasonic flow meter on the Bradbury Dam penstock is used to measure the

1 water being released from Lake Cachuma through the river outlet works. When water  
2 rights releases from Lake Cachuma and Non-Project Water are being comingled at the  
3 Bradbury Dam river outlet works, the sum of the Accusonic flow meter, the Santa Ynez  
4 Pumping Plant effluent meter, and the Hilton Creek Pipeline release is the total water rights  
5 release. During these periods the effluent flow meter at the Central Coast Water  
6 Authority's (CCWA) Santa Ynez Pumping Plant is used to measure Non-Project Water (State  
7 Water Project Water) being pumped into Lake Cachuma.

8 CCWA contracts with an independent calibration technician, acceptable to  
9 Reclamation, to calibrate the ultrasonic flow meter on the Bradbury Dam penstock and the  
10 differential pressure effluent meter at the CCWA Santa Ynez Pumping Plant. This is done on  
11 an annual basis, or more frequently if requested by Reclamation as stipulated in the  
12 Warren Act Contract. Written reports of the calibration of both meters are submitted to  
13 Reclamation within ten (10) working days after the calibrations are completed.

14 **IX. SUMMARY**

15 Reclamation operates the Cachuma Project to meet the water needs of the Project  
16 contractors. As part of our operations we first meet prior water right and environmental  
17 requirements. My testimony has covered these operational requirements, and has  
18 summarized certain physical and operational data for the Cachuma Project.

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